Abstract Submitted for the DFD12 Meeting of The American Physical Society

Effect of Secondary Flows on convection-dominated dispersion ALESSANDRA ADROVER, La Sapienza Università di Roma, ELISABETTA VECA, Centro Ricerca ENEA Casaccia — We investigate the effects of secondary (transverse) flows on "convection-dominated dispersion" of pressure driven, open column laminar flow in a conduit with rectangular cross-section. In the convectioncontrolled dispersion regime (i.e. laminar dispersion in finite-length channel with axial flow at high Peclet numbers) the properties of the dispersion boundary layer and the values of the scaling exponents controlling the dependence of the moment hierarchy on the Peclet number are determined by the local near-wall behavior of the axial velocity. The presence of transverse flows strongly modify the localization properties of the dispersion boundary layer and consequently the moment scaling exponents. Different secondary flows, electrokinetically induced and independent of the primary axial flow, are considered. A complete scaling theory is presented for the dependence of the *n*-th order moment of the outlet chromatogram as a function of the axial Peclet number, the secondary flow's pattern and intensity.

> Alessandra Adrover La Sapienza Università di Roma

Date submitted: 30 Jul 2012

Electronic form version 1.4